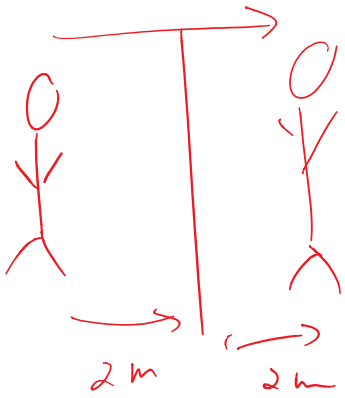
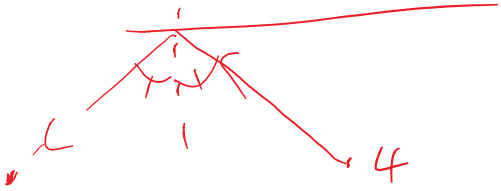
1.



2.



3 virtual + erect

4 Concave - real
Virtual - all

5 $m = \frac{f_o}{f_e} = \frac{3m}{0.012\,mm}$

250

6 $\frac{n\lambda}{d} = \frac{x}{L}$

7 isotope

8 32 - 15 = 17

9 α

16 β^-

18 $n \rightarrow p$ atomic # ↑ 1

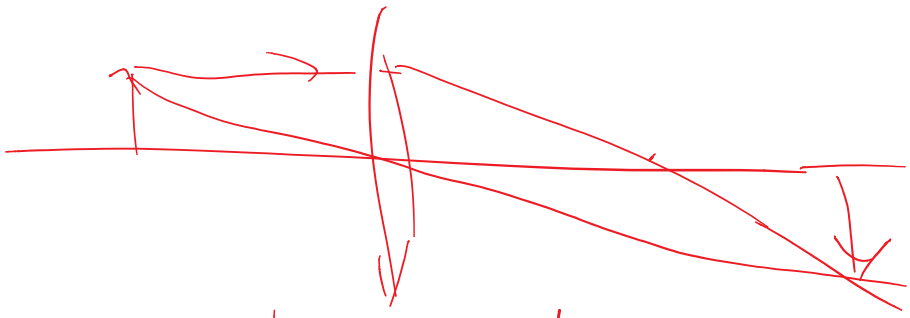
13 no change

14 $_0^1n + {}^{235}_{92}U \rightarrow Ba + Kr + 3n$

15 joining

16 atomic number

17



b) $\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$ $\boxed{d_i = 13 \text{ cm}}$

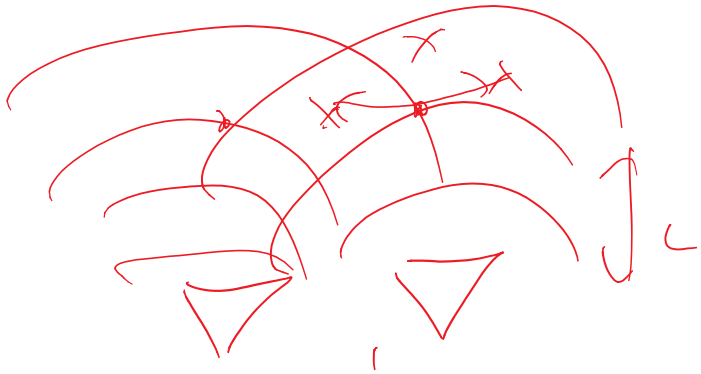
c) $m = \frac{-d_i}{d_o} = \frac{-(13)}{8} = \boxed{-1.7\times}$

13.33333/8=1.66667

2 $\lambda = \frac{V}{f} = \frac{343\ m/s}{440\ /s}$

$= \boxed{0.78m}$

b)



$\frac{x}{L} = \frac{n\lambda}{d}$

$x = \frac{0.78m\,(2.0m)}{1.5m}$

$= \boxed{1.0m}$

3 a) $4.0026... + 14.0027...$

$= \underline{18.005677\ u}$

b) $15.999... + 1.007825$

$= \underline{17.006956\ u}$

c) $\Delta m =$

18.005677-17.006956=

0.998721 u
0.998721x931=929.809251
930 MeV
931MeV/c^2 $E=mc^2$ =

4a - they collide with the nucleus and make it unstable

b) the fission creates neutrons that initiate more fission reactions.

c) slows the neutrons speeding up the reaction

p688
ch2 - sfs, math stuff
ch3 - displacement, velocity v=d/t if v is constant = slope of dt graph
ch4 - acceleration, a = change in v/t = slope of the v-t graph
4 equations vf=vi +at ....
g is 9.8m/s^2 = acceleration of falling bodies without air resistance

ch5 $F_{net}=ma$ = sum of all forces
$F_f=\mu F_N$ =
F_N is the normal force = Fg on a level surface not in an elevator
Fg=mg = mass x 9.8N/kg
$Fg=GMm/r^2$ = pull between all bodies
Ch9 momentum, p=mv is conserved in collisions and explosions, is a vector
impulse = change in p = Fnet x time = area under the Fnet - t graph
ch10 work W=Fd = area under F-d graph
not a vector - no direction
power = W/t efficiency = wout/win x 100%
ch11 energy
conserved
kinetic energy = $1/2mv^2$
gravitational energy = mgh
elastic force F=-kx x is the change in length of the elastic, k is the elastic constant $E=1/2kx^2$

ch 12 heat

Q=mcΔT c is specific heat capacity 4 180 J/kgK for water

Q=mH for changes of state

QA=-QB

Ch 14 waves v=λf

ch 15 sound - Doppler effect, resonance,

ch 16 light - electromagnetic radiation move at c in a vacuum,

ch 17 refraction snell's law

n=c/v

$n_1 \sin\theta_i = n_r \sin\theta_r$

ch 18 mirrors and lenses

$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$ $m = \frac{h_i}{h_o} = -\frac{d_i}{d_o}$

ch 19 not on final

ch 30 nuclear radiation, half-life

ch 31 nuclear energy stuff

mass defect x 931 MeV/u= energy

$E=mc^2$ for mass in kg

relativity

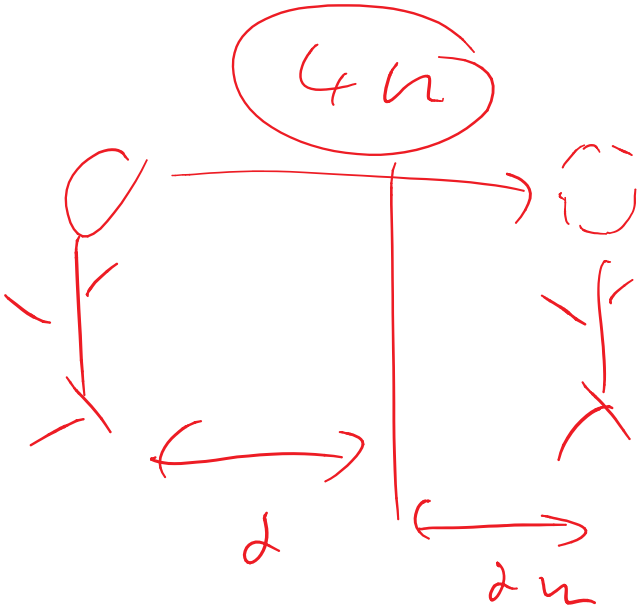
nothing moves faster than light

time changes as you get closer to the speed of light - twins paradox question

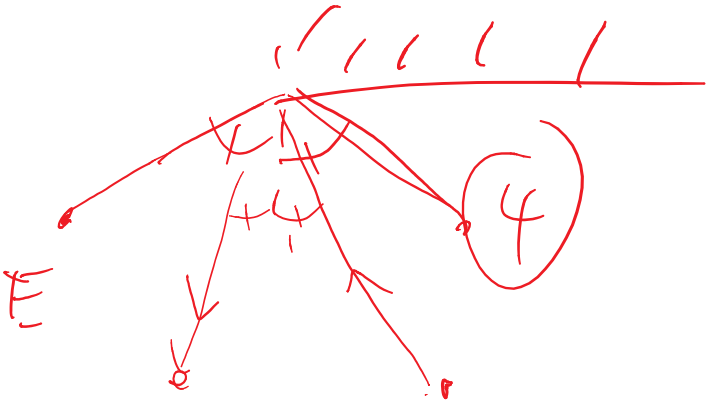
$t = \frac{t_0}{\sqrt{1-\frac{v^2}{c^2}}}$

wow!

1.



2.



3 virtual event

4 Virtual - all

ideal - concave

5 $\frac{3\text{m}}{0.012\text{m}} = 256$ Beams

6 

7 & 32 - 15 = 17 neutrons

9 α 10 beta

11 alpha → 4 mass, ^4_2He

12 no change for γ

13 $Pb \rightarrow Bi$; $n \rightarrow p$

14 fusion = joining

15 $n + {}^{235}_{92}U \rightarrow Ba + Kr + 3n$

16 atomic mass

17

Year in review

ch 2 sig figs, math stuff - graphs
ch 3 displacement, velocity v=d/t if v is constant
v= slope of d-t graph
ch4 acceleration a=change in v/t = slope of a v-t graph. d= area under a v-t graph
4 equations
vf=at+vi
$d=1/2\ at^2 + vit$
$vf^2 = vi^2 + 2ad$
d=1/2(vf+vi)t

g is acceleration due to gravity with no air resistance = 9.8 m/s^2

ch 5 Newton's laws
Fnet =ma = vector sum of all forces
vector - includes direction
scalar - no direction

$F_g = mg = GMm/r^2$ gravitational force
near earth force of gravity = mass x 9.8N/kg
far from earth or generally all masses pull on each other with a force Fg = G mass / distance between them squared
$G=6.67 \times 10^{-11}\ Nm^2/kg^2$ gravitational constant

Frictional force $F_f=\mu F_N$
μ is the coefficient of friciton
F_N is the normal force = Fg on a flat surface that is not an elevator

F=ma

ch 9 - momentum , p = mv
impulse = change in momentum = Ft = area under the Fnet - t graph
momentum is conserved in collisions and explosions - momentum is a vector

ch 10 - work, W=Fd = area under the F-d graph
power P=W/t
efficiency = Wout/Win x 100%
work and energy are scalars
ch11 energy
kinetic energy = $1/2mv^2$
gravitational energy = mgh

ch 12 - thermal energy
$Q= mc\Delta T$ c is specific heat capacity, 4180 J/kgK

for water
Q=mH H is heat of fusion or vapourization - changes of state
thermal equilibrium Qa=-Qb
heat lost = heat gained

Ch 14 waves $v=\lambda f$
f=1/T (period)
Ch 15 sound - doppler effect - resonance
ch 16 electromagnetic radiation moves at c in a vacuum $c = 3.0 \times 10^8$ m/s
ch17 refraction snell's law
n=c/v

$$n_i \sin\theta_i = n_r \sin\theta_r$$

ch 18 mirrors and lenses

$$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i} \qquad m = \frac{h_i}{h_o} = \frac{-d_i}{d_o}$$

ch 19 not on exam

ch 30 and 31 nuclear physics stuff
half-life
radiation
binding energy
$E=mc^2$ for mass in kg
E = mass defect x 931MeV/u for mass in u

relativity
postulates:

1 speed of light is the same in all frames
2 laws of physics are the same in all inertial frames

time is different in different frames of reference - twins paradox question

$$t = \frac{t_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$